

Dissertation

HMIS Replacement and Implementation of New Software
(BMCHRC)

By

Dr. Vaishnavi Rajesh Rawal (1232)

HMIS

(Hospital Management Information System)

- Health Management Information Systems (HMIS) are one of the six building blocks.
- *“A tool which helps in gathering, aggregating, analysing and then using the information generated for taking actions to improve performance of health systems”.*
- Gathering / collection
- Aggregating
- Utilization
- Analyzing
- Transmission



Importance

- Basis for evidence – based policy and informed decision-making.
- Improves the governance and accountability by increasing transparency.
- Empowers the communities with understandable health information towards improving the delivery and quality of services for patients.
- Improve the overall health system from a broader, comprehensive perspective.

Study Purpose

- In order to improve the Patient Safety, increase Work Efficiency, manage Data security and most importantly “Go paperless”, BMCHRC needed to implement new HMIS in the hospital.

Overall Goal

- To identify need for future Health Management Information system in BMCHRC to provide recommendations for better monitoring of health system performance in the Hospital.

Objectives

- Provide quality information to support decision- making in the health sector.
- Aide in setting performance targets at all levels of health service delivery.
- Assist in assessing performance at all the levels of the health sector.
- Encourage the use of Health information.

Process Initiative

Introducing an integrated systems that would provide information on:

- Patient inflow and demographics, outpatient, casualty, admissions as inpatient, Discharge information in case of inpatients, Equipment and infrastructure related information for administrative purposes.

- This would assist the Hospital to:
 - 1. Increase access and raise the quality of a series of highly cost-effective interventions to improve health outcomes of the poor and underserved population with a focus on the regional disparities.
 - 2. Strengthen the institutional and policy framework for the health system in BMCHRC.

Design/ Approach

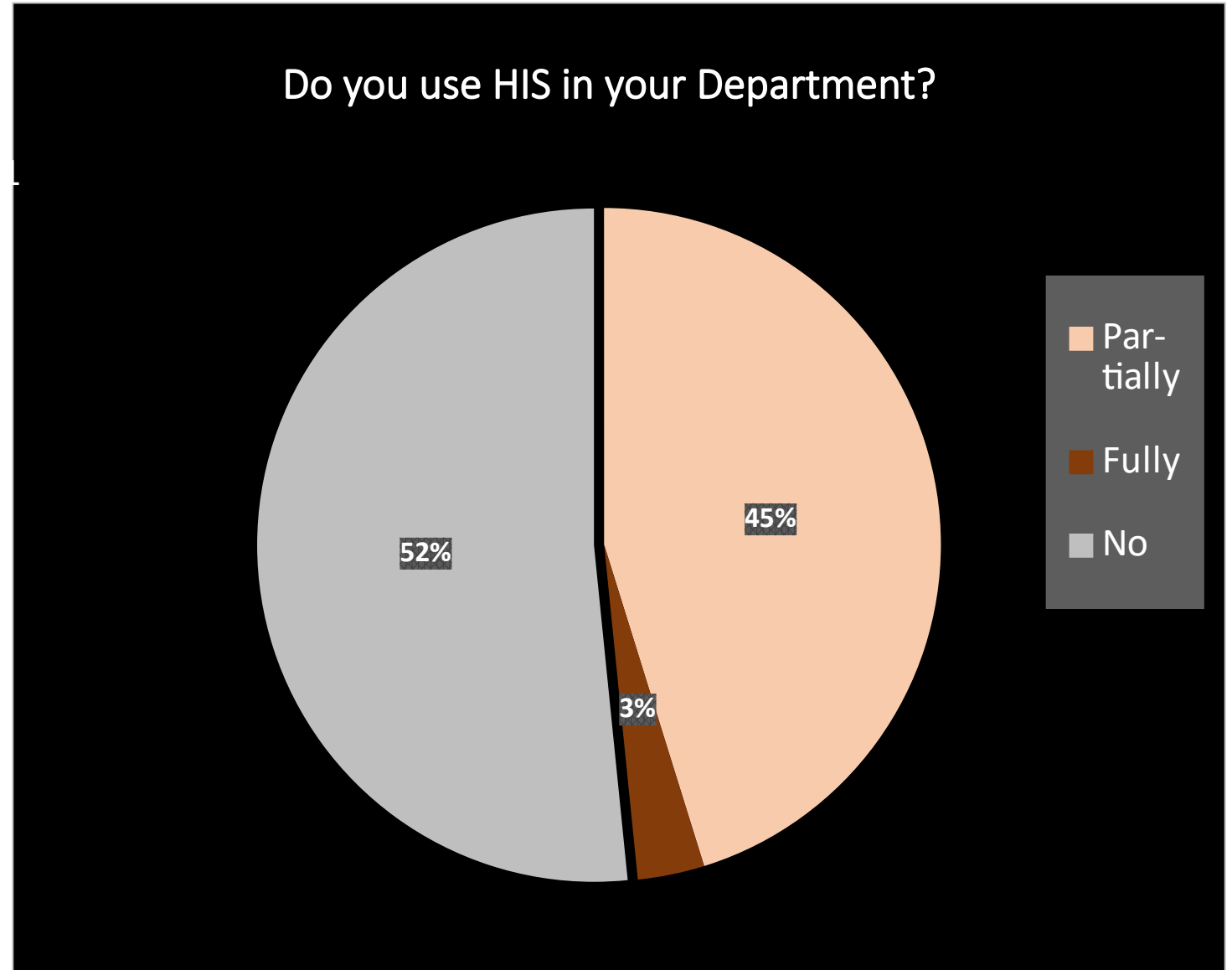
Plan of Action

Data Analysis



Interpretation:

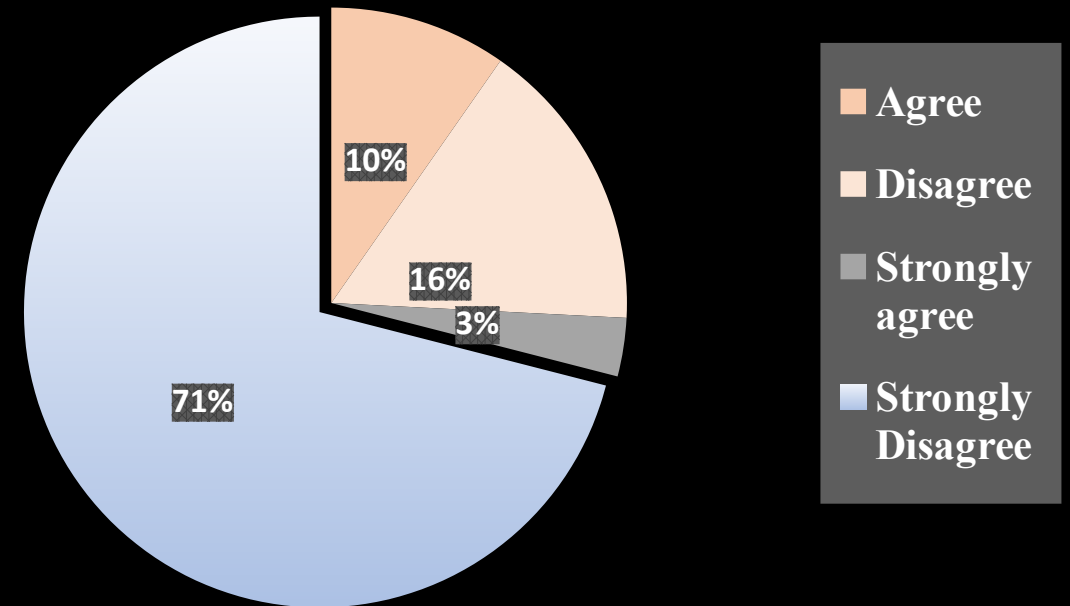
Figure 3.4.1 summarizes that, there are 31 responses from each department. As per the data observed in the google form, it depicts that out of all 25 departments, 51.6% says that they don't use the HMIS in their domain. About 42.2% of dep has functional HMIS who use the system partially. And only 3.2 % (1dep) use the system completely and has a functional flow in the hospital through the HIMS.



Interpretation:

Figure 3.4.2 Reveals that the majority of the departments i.e. about 71% require computerized data. This has been told by multiple number of consultants that the data which is been captured from the system is more reliable than the manual. However, Digital data shouldn't be replaced by manual practice ex- feeding the data in the paper. It is believed that the system gives accurate MIS which is required for the patients and organisation

Recording computerized data is boring and should be replaced back to paper-based recording?

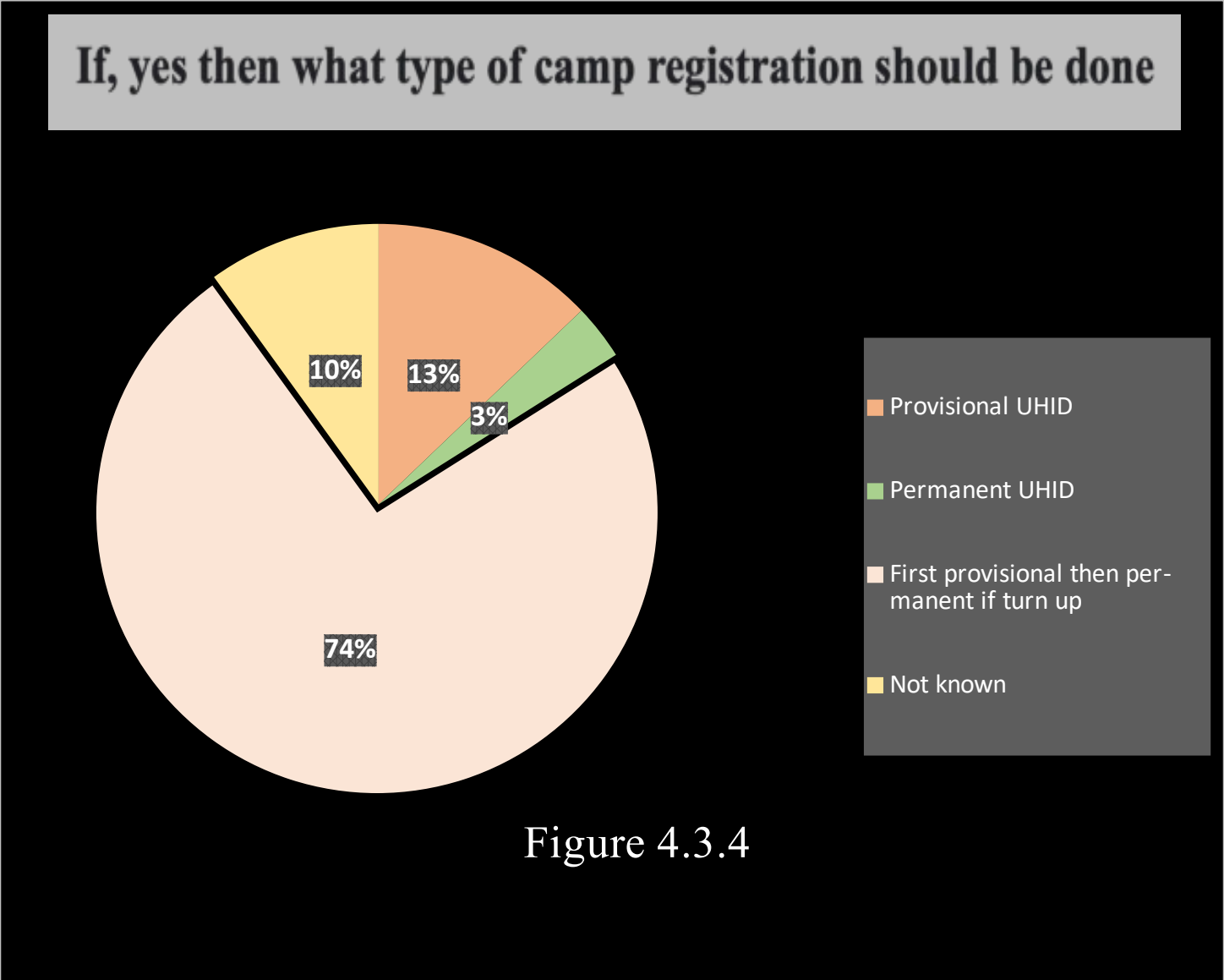


Note : The process for the Camp Registration is done manually so far and Provisional UHID has been generated for the same. This scenario was a point of discussion with the senior management and other clinical department as well. Therefore, this questionnaire had been raised that what should be in the case to camp patient and what type of UHID shall be provided to such patients.

Interpretation:

According to the results in Figure 3.4.3 it clearly states that about 87% of the staff thinks what the hospital require camp registration at the time of seeing the patients in the system.

Figure 3.4.4 summarizes, 74% of the staff suggests that the registration of the camp patient should be given the provisional UHID at first (at site). Once this patient turn up in the hospital for the treatment, a permanent UHID will be provided to the patient. It will be mandatory for the camp patient to do the registration again to convert into a hospital patient with the permanent UHID. The provisional UHID of camp will be tagged along with the hospital. Based on tagging of provisional ID, MIS will be generated related to conversion of patients from camp to the hospital.



Interpretation:

In the current system there no module for the treatment planning system for the treating doctors.

Therefore, in respect to that question Figure 3.4.5 about 77% of the Doctors are in a favour of having the “Treatment Planning System (EMR)” on their system in order to prescribe the medications and investigations online, so that the same shall be shown to the concerned nurses, Laboratory and the billing department as well for generating the receipt against the order. Wherein, this would lead to the time consumption for the patients, treating doctors, nurses, laboratory and billing users as well.

Do the clinical department need the record treatment like the medication, investigations, procedures etc. (Treatment planning systems)?

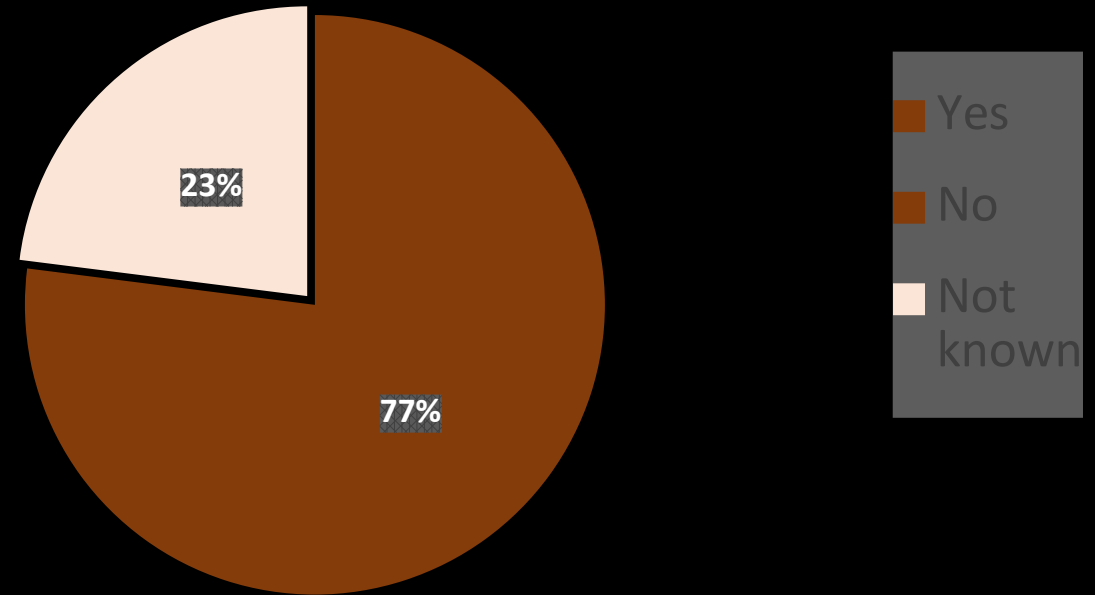
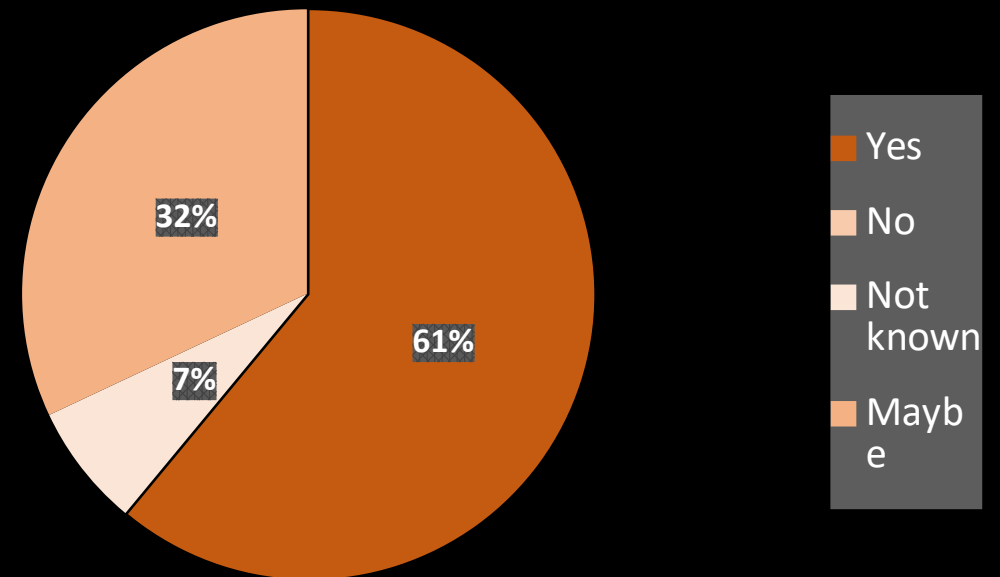


Figure 4.3.5

Interpretation:

In Figure 4.3.6 About 61% of the senior doctors raised the requirement for the graphic record of the vital signs in the system, so that the electronic record allows each component to be represented in graphic form, for easy assessment of changes. ,Therefore, this feature must be imposed in the system as per the majority of the doctors.

Does senior doctors need the graph record of the vital signs?



Interpretation:

According to the doctors, the OP/IP EMR automates the inpatient clinical workflow. They believe that technology incorporates integrated clinical practices support tools for enhanced patient safety and outcomes.

Figure 4.3.7 depicts that about 55% of the department believes that there should be the module and functional flow for OP/IP EMR. It's also been said that EMR system can be accessed anywhere, anytime by the entire care team.

On a scale of 1-5, how much do you think that the system should have OP/IP EMR
31 responses

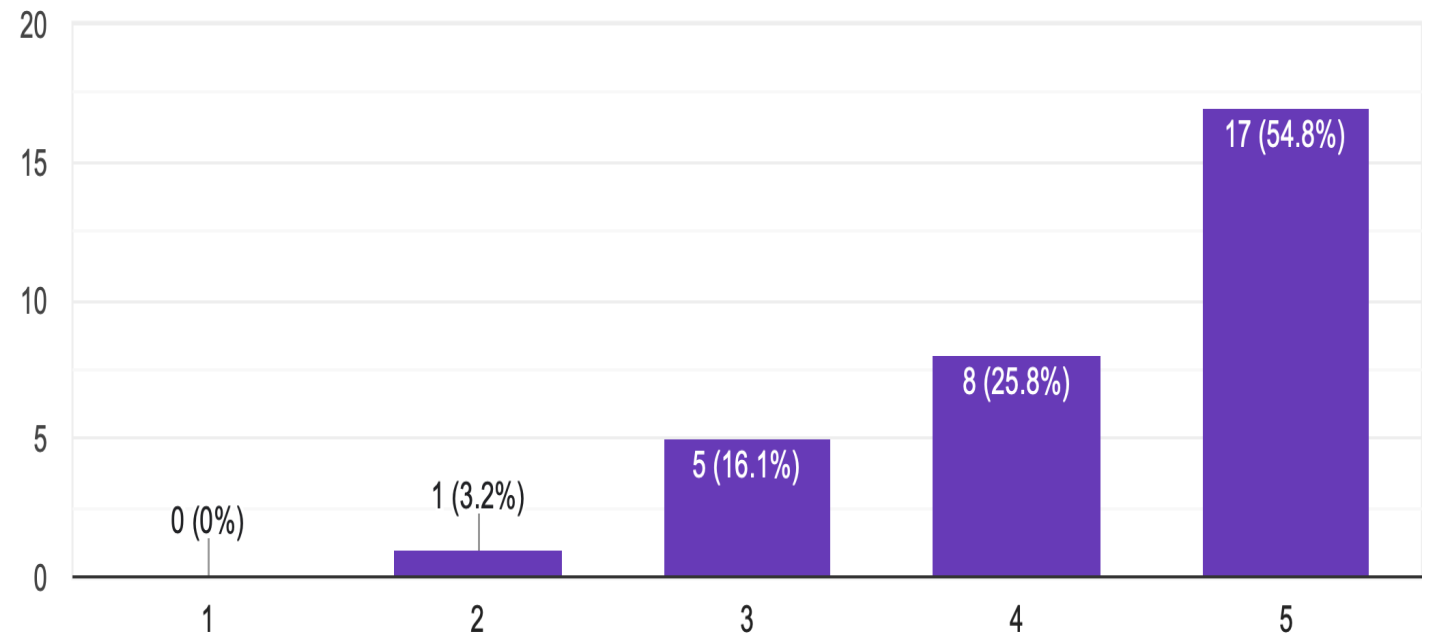


Figure 4.3.7

Interpretation:

As its already mentioned in the hospital's overview that BMCHRC is a NABH Accredited hospital.

Therefore, it somehow becomes mandatory to capture Turn over time (TAT) of every domain.

According to the figure 4.3.8 More than half of the hospital's dep require TAT for certain procedures.

Data quality which is been published by the system to the users are authentic and easy to analyse. TAT requires accurate, adequately-analysed, interpreted and communicated data. Wherein, most to the department have put the requirement for TAT capturing window.

Does your department need TAT capturing window?

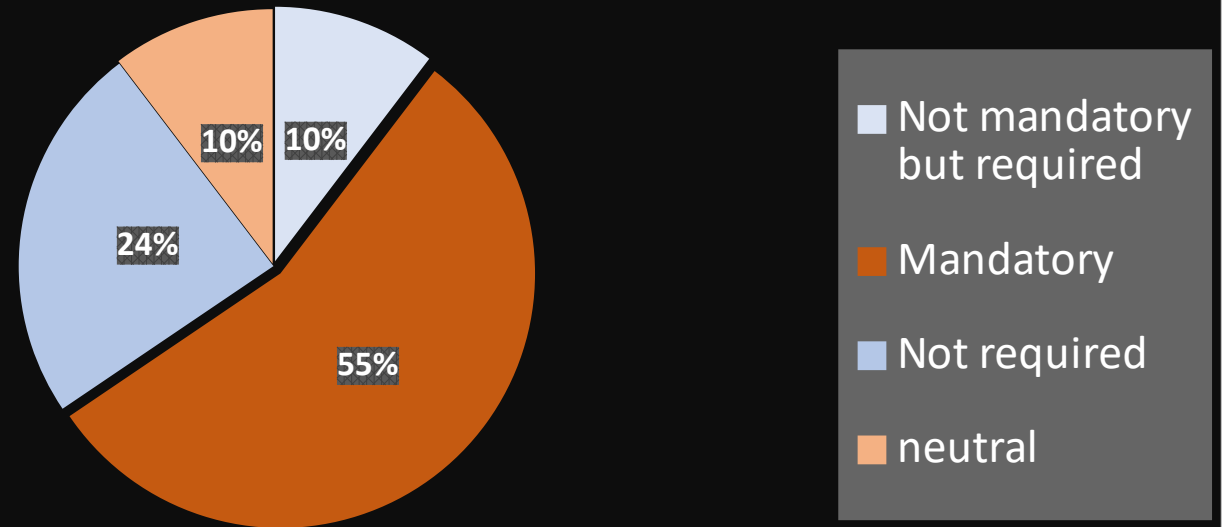
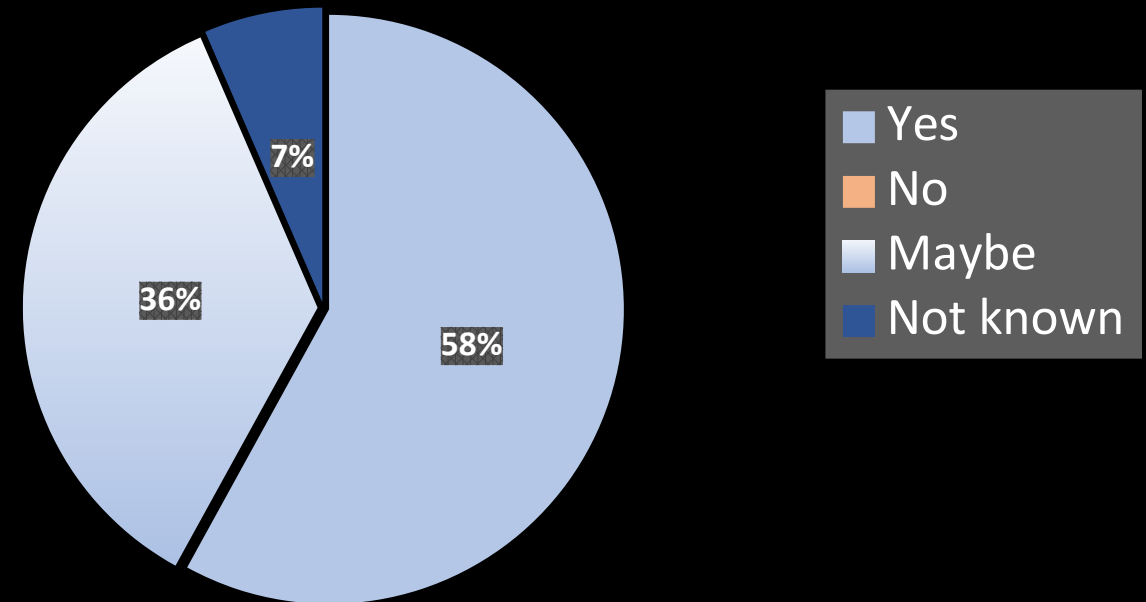


Figure 4.3.8

Interpretation:

According to the figure 4.3.9 summarizes that about 58% of the departments and HoD's of each department require that there must be the functional flow of the nursing plan along with the IP/OP EMR. It is believed that it will easily help the nurse to identify the unique role in attending to patient's overall health and well-being without having to rely entirely on the doctor's orders or intervention. The module support the holistic care which involves the whole person, including physical, psychological, social, and spiritual, with the management and prevention of disease.

In order to define the type of nursing care required (e.g. Medicine and diet to be given, health indicators to be watched etc.) , do you need a nursing care plan in HIS?



Interpretation:

Dossier here means in the reference of the stock availability or the set availability in OT. It is a collection or set of requirements required to perform particular OT according to the patients' illness.

According to the figure 4.3.10 68% of the OT staff have urge to require dossier billing feature on the upgraded software.

This feature will provide benefits of revenue protection, increased operational efficiency and substantial saving of time and money involved in the manual billing. In this dossier indent will be raised by the OT by the user, and the indent which had been raised will be shown directly to the OT pharmacy.

Therefore, this is how the kit (with expected usage of Qty. of drugs, consumables and Misc. items) preparation according to the dossier will be done.

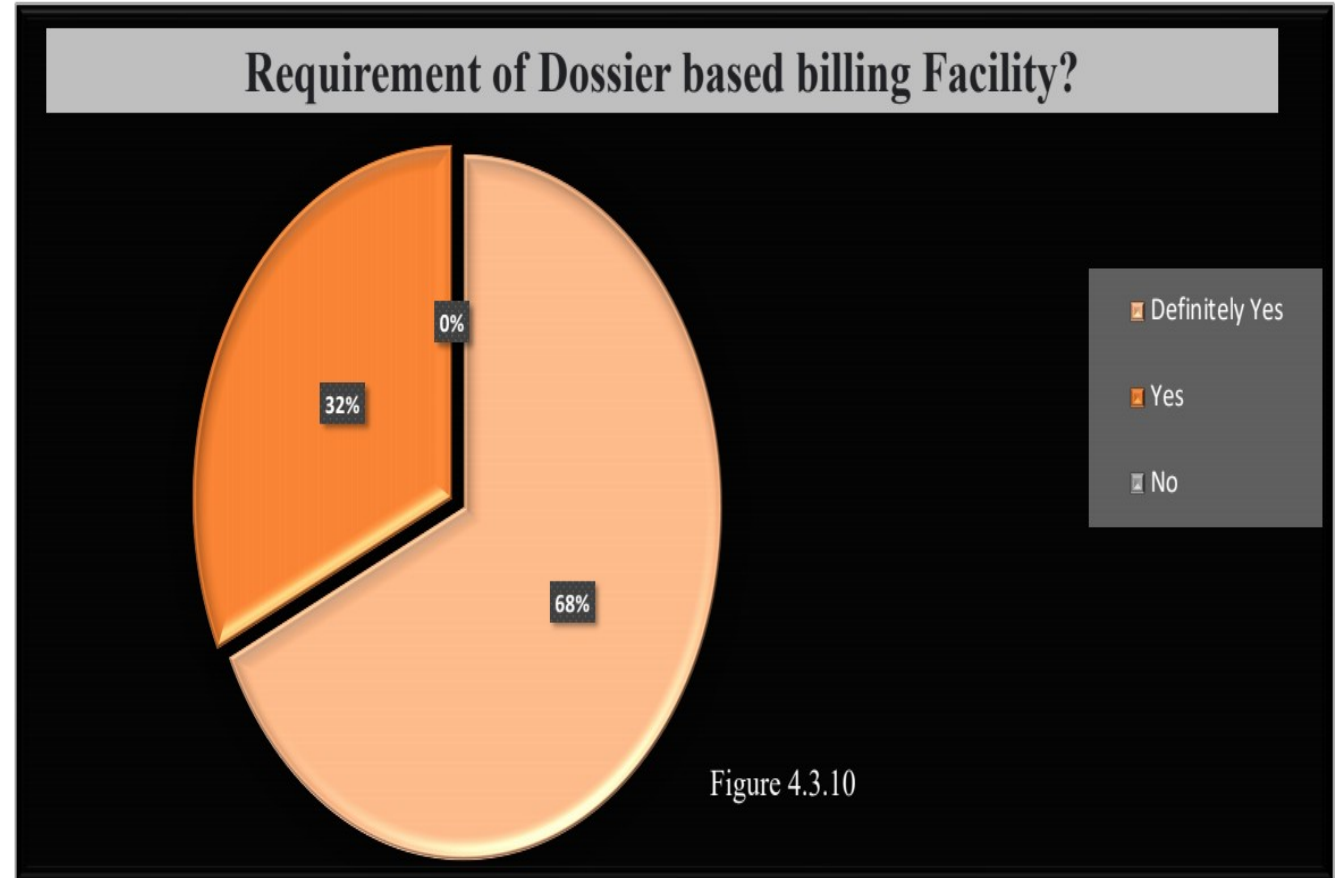


Figure 4.3.10

Interpretation:

Auto indenting feature controls the level of indentation. It should be based on Min stock from all the sub stores to main store and explained and its benefits. As it is manually done, it is to be automated in the coming software. According to the figure 4.3.11 it shows that majority of the users are agreed for this feature as it will save a lot of repetitive manual work, time and money and eliminates the chances of human errors of omission and transcription

Requirement of Auto Indenting and Auto Purchase Request feature?

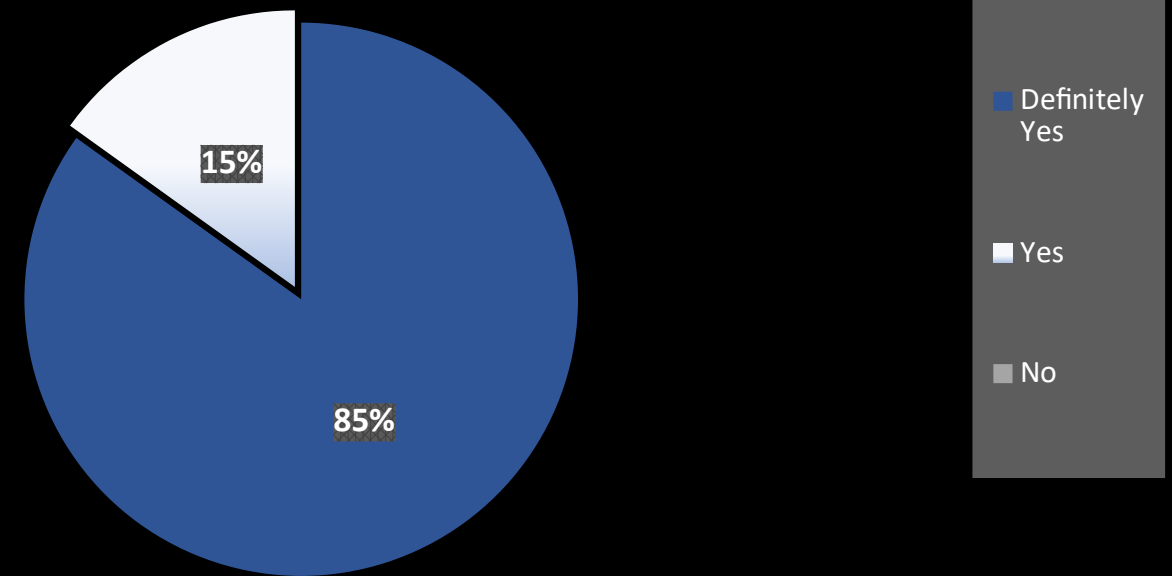


Figure 4.3.11

Interpretation:

According to the Figure 4.3.12 ADT module is required in the majority i.e. 81%, as this module takes care of admission, discharge and the transfer of a patient seamlessly. This module enables the search on availability and manages the allocation of a bed, ward and room to a patient according to the availability or costs associated and thereby managing the transfers. It take care of appropriate discharge process is followed and also ensures a comprehensive discharge summary is generated at the end.

Requirement of Admission, Discharge, Transfer (ADT) Module

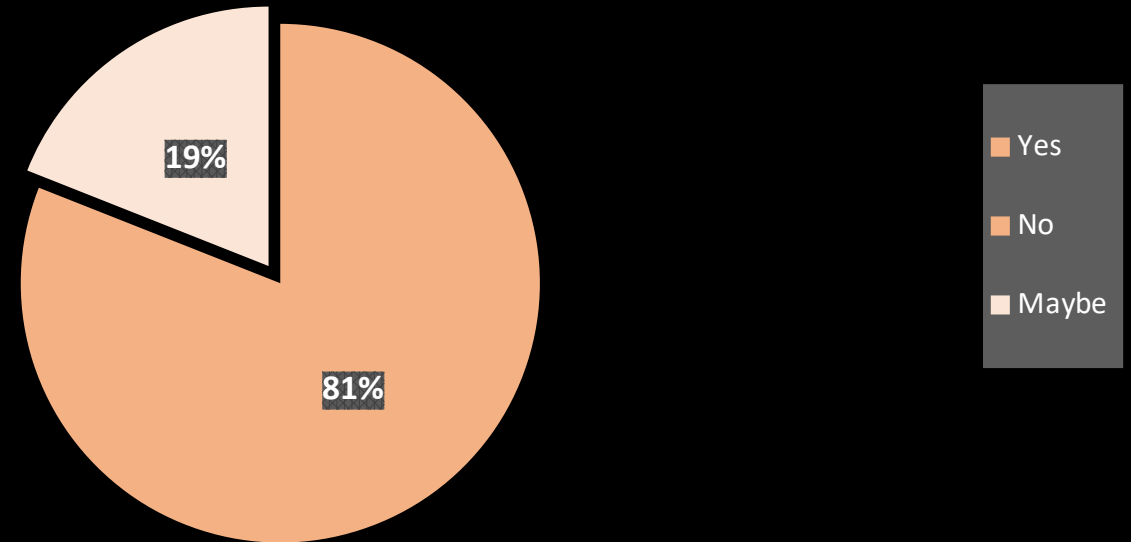


Figure 4.3.12

Interpretation:

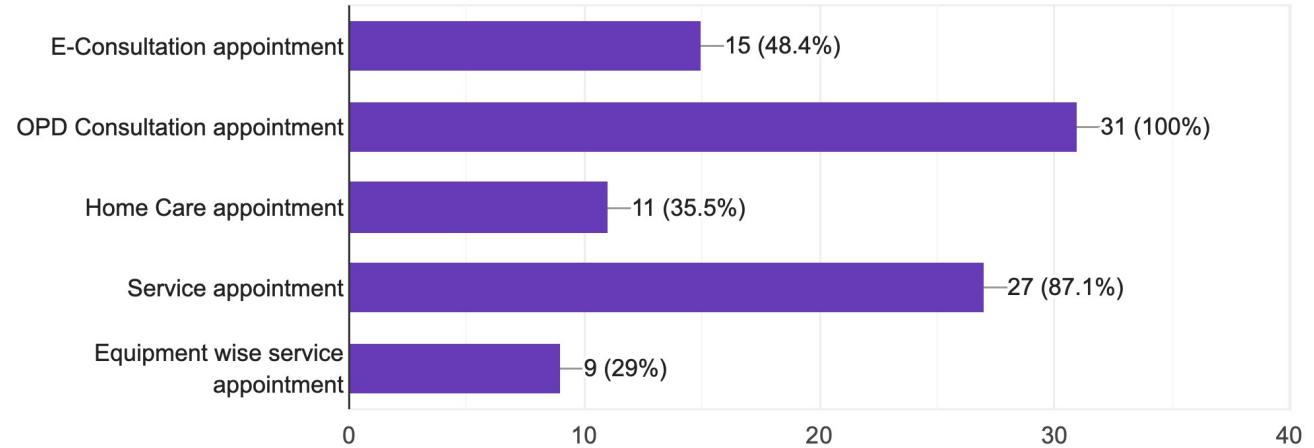
According to the figure 4.3.13, It has been suggested that:

OPD consultation appointment
(100%)

Service appointment (87.1%)

E-Consultation appointment
(48.4%), should be given the at most preference for implementing these appointments.

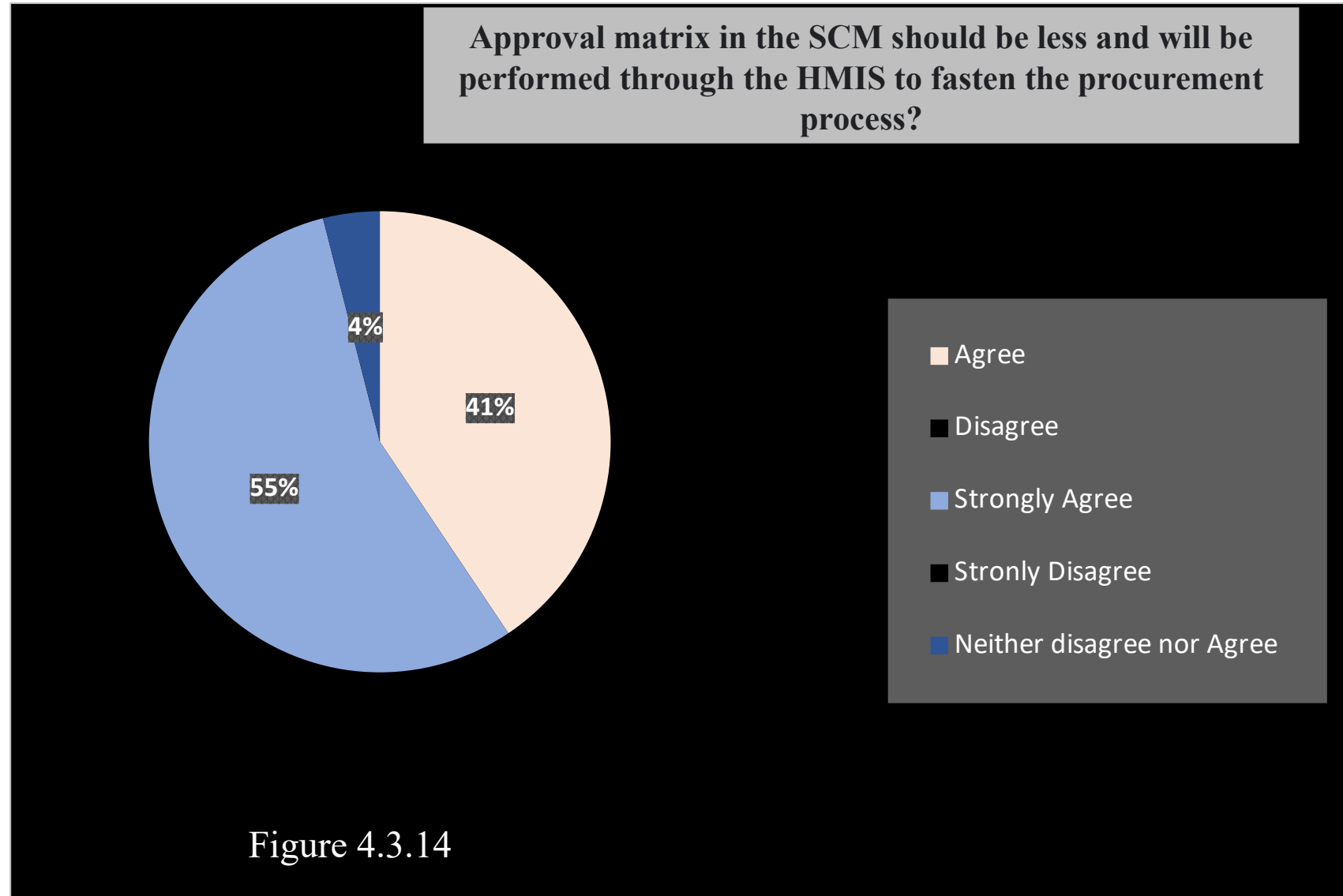
What type of appointments are required from the new HMIS
31 responses



• Figure 4.3.13

Interpretation:

According to the figure 4.3.14, it depicts that 55% of the staff strongly agree that the approval matrix should be less in the organisation and the approval process if required should be done through the system to initiate the procurement process.



Interpretation:

This questionnaire had only been asked from the HR department that what modules is to be implemented in phase- 1

According to the figure 4.3.15 it has been suggested that three modules which as got the higher percentage i.e.

Leave management
Payroll
Attendance, will be taken in the phase – 1

which HR module is required in PHASE 1

23 responses

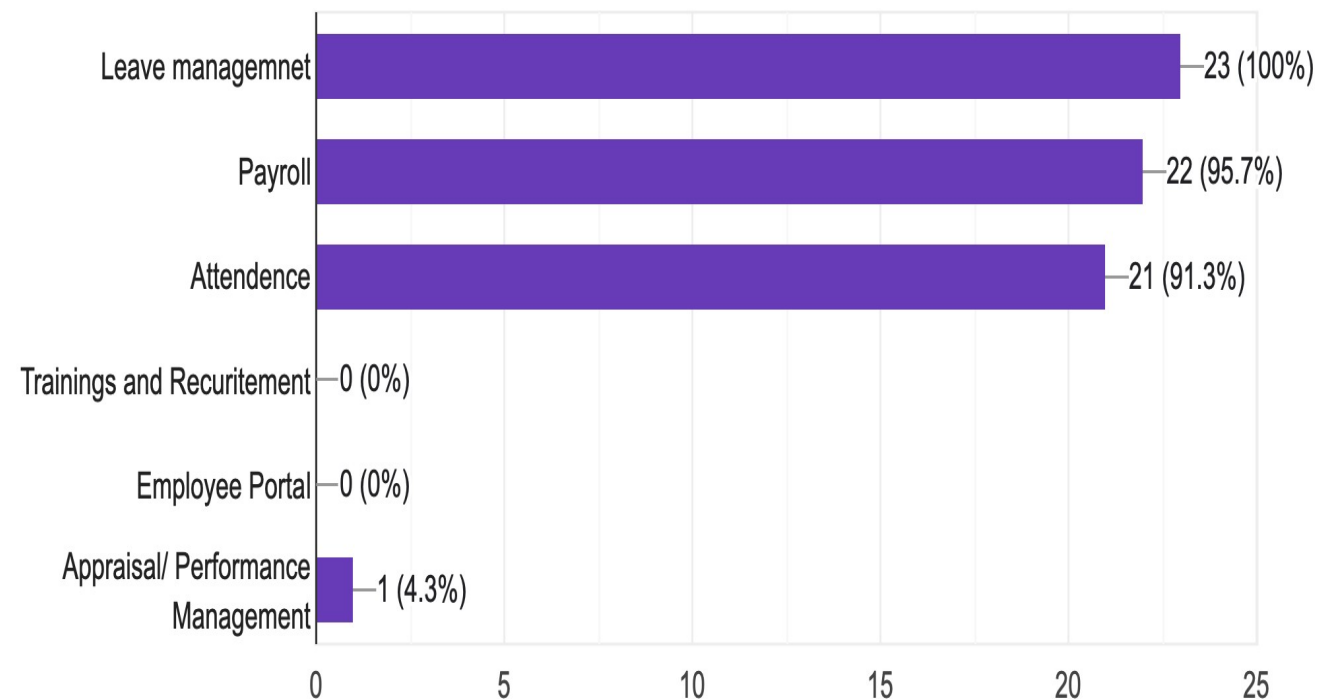


Figure 4.3.15

As the initial user training of 25 department in phase – 1 is already being done. Therefore, it is noted that 74.2% of the staff is satisfied with the upgraded system and is user friendly.

However, customization is still required in some of the modules. But the technical/ development team has ensure about the requirement to be provided in the UAT.

On A Scale of 1 to 5, do you think Upgraded software (Shivam Medisoft) will meet the required expectations and user's friendly?

31 responses

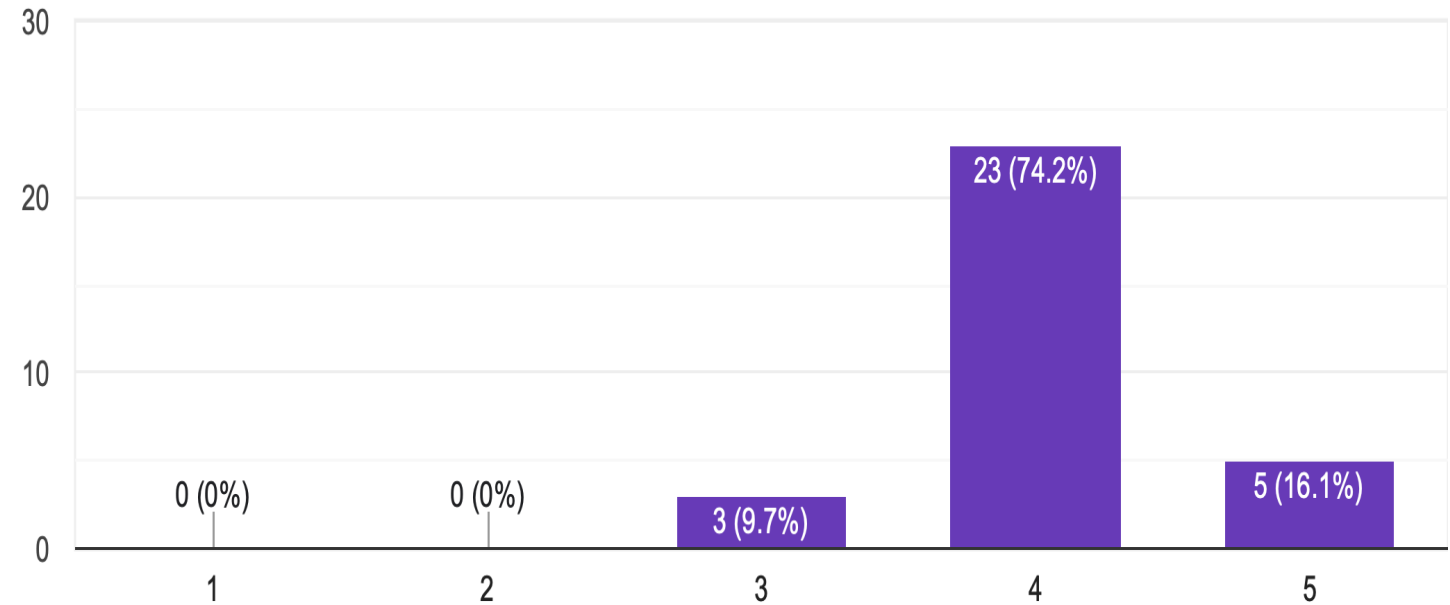


Figure 4.3.16

HMIS REPLACEMENT AND IMPLEMENTATION



A. Preliminary Information Document (Current Software information)

A. Current software's in use

Areas of Automation – Software in use	Name	In use since when? (Year)
Name of HMIS Software	PCS Prodoc	2011
Name of Accounting Software	Tally Solutions	2013
Name of HR & Payroll Software	TimeLabs	2013
Name of PACS Software	PACS Fujifilm	2018

B. Scope

Areas of Automation - Department / Module / Functionality Name	In use ? Y / N	Reqd. ? Y / N
HMIS Modules		
Patient Registration	Y	Y
Doctor Appointment Scheduling	N	Y
OPD Consultation	N	Y
Laboratories (OPD, IP)	N	Y
Radiology (OPD, IP)	N	Y
PACS Software	Y	Y
Pharmacy (OPD, IP)	Y	Y
OPD Billing (Cash, Credit, Scheme for Staff /Staff dependents)		
Theatre Booking	N	Y
IP Reservation, Admission, Discharge Transfer	N	Y
Wards	N	Y
Operating Theatre Operations, Billing	Y	Y
Electronic Medical Records	N	Y
OP Nursing, IP Nursing Charts	N	Y
IP Billing (Cash, Credit, Scheme for Staff / Staff dependents)	Y	Y
Doctor Payment	N	Y
MIS / Dashboard Software	N	Y
Purchasing	Y	Y
Inventory Control	N	Y
Accounts Receivable	Y	Y
Accounts Payable	Y	Y
General Ledger	Y	Y
Fixed Assets	N	Y
HR	Y	Y
Payroll	N	Y
HMIS Portals		
Patient Portal	N	Y
Doctor Portal	N	Y
HMIS Apps		
Mobile App for Patients	N	Y
Mobile App for Doctors	N	Y
HMIS Interfaces		
SMS Interface	N	Y
Email Interface	N	Y
WhatsApp Interface	N	Y
Bar Code Labels	Y	Y
Lab Equipment Interfaces - If Yes, please state how many	Y	Y
PACS interface	Y	Y
Credit Card interface	N	N
Payment Gateway	N	Y
Queue Management System interface	N	Y

C. Computer Installation details- Hardware, Operating System, Database & related details

Server/s - Server/s with Configuration details of each Server

PCs / Clients- Number of PCs / Clients

Printers - Number of Printers by type of Printer

Database - Database Software with version

Server Operating System - Server Operating System with version for each Server

Client Operating System - Client Operating System Name with version

Other communications / connectivity software in use - if any

Backup device/s with configuration

Replacement of HMIS

Objective

The main objective of its replacement is to obtain a system that provides future proofing.

1. Provide international level quality of Medical care to Patients.

2. Provide Medical records electronically to Care giver at the Point of Care

3. Create a Paperless environment by computerizing all Administrative, Clinical & Financial processes.

4. Provide up to the minute, accurate and customizable MIS for management decision making

New HMIS

Company Information	Description
Company Name:	Shivam Medisoftware Services Private Limited
Head Quarter:	Karkhana, Hyderabad
Software Development Office:	Neosoft HMS
Software Support Office:	Neosoft HMS
Year Company Founded:	2002
Number of Development Staff members	8
Number of Support Staff members	15
Number of Domain Staff members	25

Level of Customisation

L1 - After Gap analysis and until Go Live

L2 - After 1 month of Go Live

L3 - After 3 months of Go Live

Implementing HMIS

The mandate given to the software solution provider was to implement a solution that would cover all the **45 modules**.

Phase	Deliverables		Implementation
	Modules	Interfaces	
1	30	2	All core modules and interfaces
1A	7	1	Remote access to Patients, Relatives & Doctors (These will be delivered along with Phase 1 but will be implemented after stabilization of Phase 1)
2	8	1	Other value add modules
Total	45	4	

MODULES

Sr. No	Module Name	Description
1	Ward Management	ER Working Dashboard
2	Appointment	Online Doctor Appointments
3	OPD	Queue Management, Reception working
5	Doctor Portal	Doctor Portal
6	Diagnostics	Phlebotomy Working Dashboard, LAB, Radiology
9	Purchase	Purchase Working Dashboard, Auto PO
11	Pharmacy	Pharmacy Working Dashboard
12	IPD	Admission Desk Working Dashboard, Billing
14	Ward Management	Wards Nurse Working Dashboard (EMR)
15	OT	OT Booking,
16	Electronic Medical Record	Doctors Working Dashboard (EMR)
17	TPA	Panel Cell Dashboard
18	OPD	Cashier Working Dashboard
19	Blood Bank	Blood Bank Working Dashboard
20	Diet	Diet Indent from Ward
21	Complaint Management	Complaint Management Working Dashboard
22	Asset	Asset Working Dashboard
23	MRD	File In and Out System for MRD
24	Financial Accounts	Financial Working Dashboard
25	Doctor Accounting	Doctor Accounting
26	HR	Payroll, Leave management, employee portal
29	Risk Management	Risk Working Dashboard
30	Admin	IT working Dashboard
31	Feedback	Patient Feedback Working Dashboard,
32	Dashboard	Top Management Dashboard
33	Objection	Objection Management
34	Dashboard	NABH Dashboards
35	Dashboard	Dashboards and Analytics
36	Gateway	Payment Gateway(Doctor Appointments)
37	Online Consultation	Teleconsultation
38	Mobile App	Patient APP (IOS & Android)
39	PACS	PACS Setup
40	Mobile App	Mobile APP(Shivam Dashboard)
41	Integration	SMS Integration, email integration

Implementation Overview

The Implementation is divided into 3 phases

Total number of modules = 45

Phase 1 = 30 modules

Phase 1A = 7 modules

Phase 2 = 8 modules

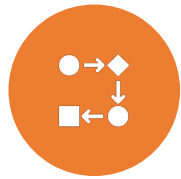
PHASE 1

No	Phase	Required Module / Functionality / Interface	Deployed	Gap Analysis Steps	
				Flowcharting	GAP Document Signoff
				(Old)	
1	Phase 1	Patient Registration	Y	Y	Y
2	Phase 1	Doctor & Service Appointment Scheduling	Y	Y	Y
3	Phase 1	Laboratories (OPD, HCK, IP)	Y	Y	Y
4	Phase 1	Radiology (OPD, HCK, IP)	Y	Y	Y
5	Phase 1	Pharmacy (OPD, HCK, IP)	Y	Y	Y
6	Phase 1	OPD Billing – Cash, Credit, Insurance / TPA, Scheme, Staff, Staff dependents	Y	Y	Y
7	Phase 1	Day Health Check Up (HCK) - Appointments, Registration, Servicing, Reporting and Billing	NA	NA	NA
8	Phase 1	Day Care, Accident & Emergency, Admission, Discharge, Transfer (ADT) including Bed Booking and OT Booking	Y	Y	Y
9	Phase 1	Ward orders & In Ward Services	Y	Y	Y
10	Phase 1	Credit control / Insurance Desk (OPD, HCK, IP)	Y	Y	Y
11	Phase 1	O. T. Operations & OT Billing	Y	Y	Y
12	Phase 1	IP Billing – Cash, Credit, Insurance / TPA, Scheme, Staff, Staff dependents	Y	Y	Y
13	Phase 1	MRD – File Tracking, Death Registration, MOH and Other Statistics	Y	Y	Y
14	Phase 1	Blood Bank	Y	Y	Y
15	Phase 1	Pathology Lab Equipment interfaces (10)	N	NA	NA
16	Phase 1	Departmental Reports	Y	Y	Y
17	Phase 1	Purchasing	Y	Y	Y
18	Phase 1	Inventory Control	Y	Y	Y
19	Phase 1	Doctor Payment	Y	Y	Y
20	Phase 1	Compliance with State and Central Government Taxes, Duties, Levies and generation of required Returns and State and Central Ministry of Health requirements and Reports	Y	Y	Y
21	Phase 1	Existing PACS Software	N	NA	NA
22	Phase 1	BI Tool	N	NA	NA
23	Phase 1	Accounting software	Y	Y	Y
24	Phase 1	Payroll	N	N	N
25	Phase 1	SMS Interface	Y	NA	NA
26	Phase 1	Email Interface	Y	NA	NA
27	Phase 1	WhatsApp interface	Y	NA	NA
28	Phase 1	Payment Gateway	NA	NA	NA
29	Phase 1	Credit Card	NA	NA	NA
30	Phase 1	Maintenance Management	Y	NA	NA

PHASE 1A		
NO	PHASE	REQUIRED MODULE/ FUNCTIONALITY/INTERFACE
1	Phase 1A	Nursing care Nursing charts
2	Phase 1A	E- Consultation
3	Phase 1A	Patient app
4	Phase 1A	Patient portal
5	Phase 1A	Doctor App
6	Phase 1A	Doctor Portal
7	Phase 1A	Product's Own integrated BI Tool

PHASE 2		
NO	PHASE	REQUIRED MODULE/ FUNCTIONALITY/INTERFACE
1	Phase 2	Home Care
2	Phase 2	Electronic Medical Record (EMR)
3	Phase 2	MIS Reports MIS Dashboard
4	Phase 2	Maintenance management
5	Phase 2	Infection Tracking
6	Phase 2	Laundry
7	Phase 2	House Keeping
8	Phase 2	HR

Methodology



Agile Model is been used for the implementation of Software in BMCHRC. Agile Model is a combination of the Iterative and incremental model.



Project plan

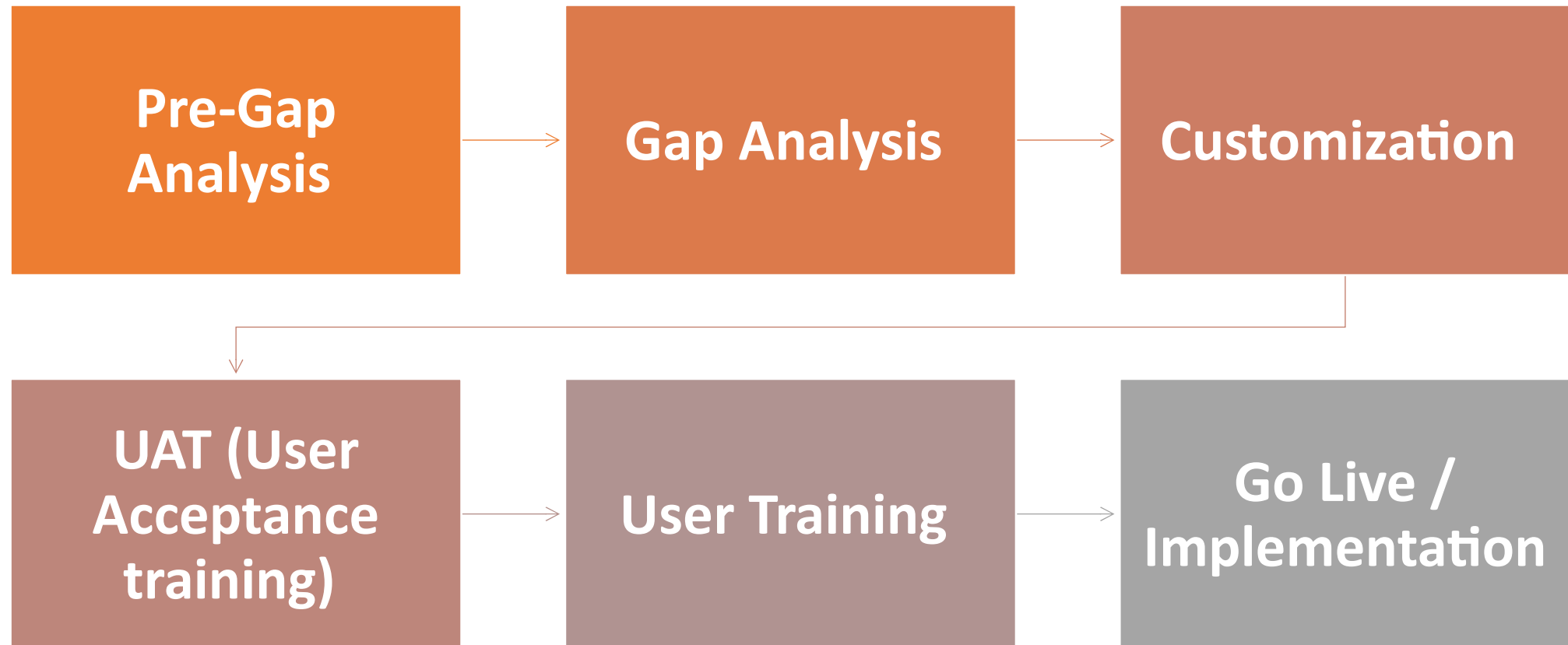


Gap study

Project Plan

- Project kick off meeting
- Gap analysis
- Decision on freezing each Gap (Hospital Process change /Acceptance of available system work around /System change)
- Customization / Configurations / Tuning at different levels as required
- Delivery of HMIS version and Interfaces on site
- Installation of the above on site
- Onsite Testing
- Interface deployment
- Data porting
- Training to Doctors, Staff, Operators, Users, HODs, IT Department
- User Acceptance testing support
- Parallel Run / Mock Run support
- Data porting
- Go Live preparation
- Go Live and Post Go Live support
- Final Acceptance
- Warranty coverage

SDLC Study



Findings

- Provision of inadequate quantity of hardware.
- Slowness of network or system.
- Non-satisfactory training after observation confirmation and sign-off process,
- Lack of data entry operators.
- Lack of accountability in the users.
- Inadequate use of computers.



Suggestions

- Use of computers in strengthening HMIS.

Factors such as cost, local expertise, available software and hardware, and local technical support, will determine the nature and extent of computerization in a specific setting.

- Facilitate training of health workers at all the levels in use of computers and relevant software and tools prescribed as a part of HMIS.
- Increasing quality and efficiency of operation at all level including expedient recording.
- Enhancing communication of data between members of health team and other staff members.
- Enhancing use of data for local and team planning which in turn enhance the motivation of the health team to strengthen the health team.

Discussions

➤ Challenges and Lesson Learnt

- Resistance to the new initiative.
- Mindset for the old system.
- Training and ensuring the use of the systems
- Gap analysis, documentations were made and identified.
- Server stabilization
- Manpower shortage
- Lack of basic computer knowledge required training.
- Mapping existing processes.

Discussions

➤ Sustainability

The purpose of implementing the HMIS was to have a grip on the pulse of the health care initiatives, its impact and the areas that need attention.

The results are clearly indicative of the success of this project. Poor patients walkout of Government hospitals with a pride of holding printed prescription slip/OP case record/Lab investigation report. The smile in their face indicates the usefulness of this system(HMIS)

➤ Monitoring Aspect

There are periodic review meetings by the stakeholders including the doctors, nurses, and the administrative staff across different levels. Each meeting is recorded and follow ups done to monitor the progress on the action to be taken.

Results Achieved

Patient Registration

SMS/ Email Integration

Payment Gateway

Doctor Prescription – EMR

Nurse Station

Radiology Procedures

Pharmacy

Supply Chain Management

Medical Record Department

Blood Centre

Dossier Billing

Auto Indenting

Results Achieved

Complaint Management

HR management – Payroll, Leave, Attendance

Sales and Marketing

NABH Indicators

TAT

MIS Reports

OT working

IP/OP billing

TPA billing

Admission

Finance and Accounts

Free ship/ Free ship Wallet

ROL based Module

Conclusion

➤ Hospital staff

- Time saved for reports and data consolidation.
- Quick retrieval of records.
- Easy analysis of the MIS data.
- Single point of data entry- at end user level.
- Uniform and standardized reporting formats across the hospital.
- Highly scalable solution.
- Ten Thousand users and one lakh patients cycled through system daily.
- 3 million transactions per day
- Real time data available - for monitoring and swift decision making by the higher authorities.
- Reduced/minimal duplication {of information of knowledge of information} entry and correct data maintenance.
- Automatic consolidation / collation of data.
- Inbuilt validations for data entry- reduction in data entry errors.
- Master data entry forms-standardized to bring in uniformity of reporting.
- User-friendly easy to use screens.

Conclusion

➤ Hospital Administration

- Quick and easy retrieval of data - real time data across hospitals/districts available online.
- Close monitoring and follow up easier with data available online. Upgraded and improved inventory.
- Human Resources Management
- Easy access to data helps to analyse disease patterns and trends.
- Evidence based decisions for investments, improvements of the Health System.
- Savings in terms of paper and records maintenance.
- Records of referral chain and patient movement.
- Easy consolidation of data-for comparison, validation, etc.
- Cost effectiveness.



Thank you